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TIMBER MANAGEMENT PLAN

HURON WORKING CIRCLE

Huron-Manistee National Forest

July 1, 1964 - June 30, 1974

Region 9

U. S. Department of Agriculture

Forest Service



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F.Y. 1965-1974

Submitted: U.M. Martineau Sigil E. Fiedell 6-8-64
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R-9 Timber Management Date

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M-U Coordinator Date

FOREWORD

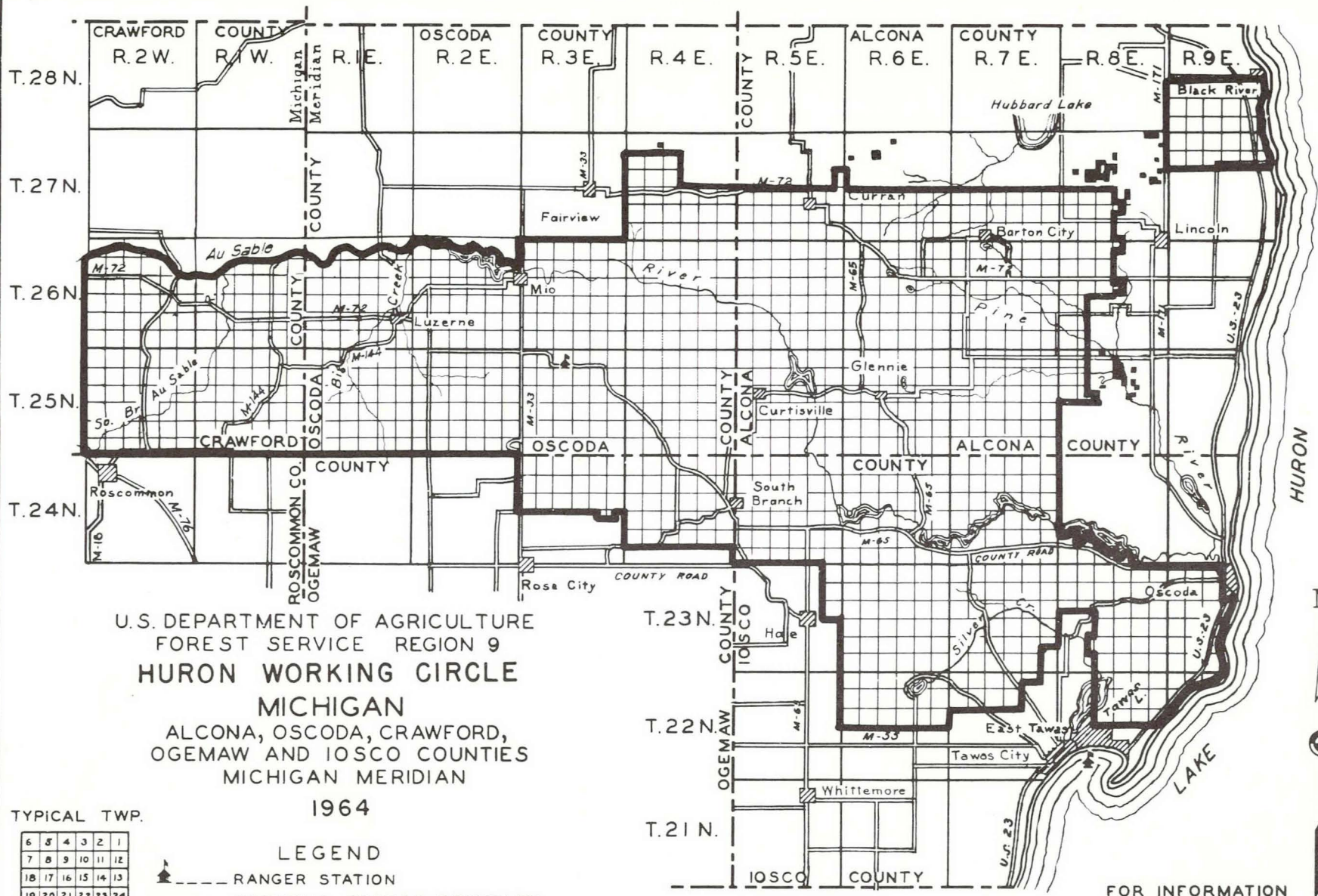
This management plan was prepared by the timber management staffs of the Huron-Manistee National Forest and Region 9. It was developed within the management direction and coordination requirements in the Regional Multiple Use Guide and the Ranger District Multiple Use plans.

The field inventory was made between September, 1962 and September, 1963. Briefly a multi-stage or cluster sample was used to collect volume and certain area data. All National Forest land was photo interpreted and delineated to stands and typed on infra-red, 1:15,840 aerial photos taken in the summer of 1960. This formed the basis for the preparation of individual compartment maps which were prepared for every compartment on the working circle that contained government land.

All data were compiled by automatic data processing methods in the Regional Office.

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U.S. DEPARTMENT OF AGRICULTURE
 FOREST SERVICE REGION 9
HURON WORKING CIRCLE
MICHIGAN
 ALCONA, OSCODA, CRAWFORD,
 OGEMAW AND IOSCO COUNTIES
 MICHIGAN MERIDIAN
 1964

TYPICAL TWP.

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

- LEGEND**
- RANGER STATION
 - NATIONAL FOREST BOUNDARY
 - MAIN HIGHWAYS

SCALE: ONE SMALL SQUARE EQUALS
 ONE SQUARE MILE.

FOR INFORMATION
 CONTACT
 FOREST SUPERVISOR
 U.S. FOREST SERVICE
 CADILLAC, MICHIGAN

HURON WORKING CIRCLE

AREA (Acres)

Regulated Commercial Forest:		
Timbered	380,360	
Nontimbered	<u>11,380</u>	
Total		391,740
Nonregulated Commercial Forest: ^{1/}		
Timbered	8,830	
Nontimbered	<u>1,230</u>	
Total		10,060
Noncommercial Forest:		
Nonproductive		100
Nonforest		11,640
All Lands		413,540 ^{2/}

^{1/} Includes Tuttle Marsh, Kirtland Warbler Area and lands outside main administrative boundary.

^{2/} As of June 30, 1963.

NET VOLUME DATA
(Timbered Commercial Forest Land - Regulated Working Group)

INVENTORY

Sawlog Material 1/:

Softwoods	52,500 MBM
Hardwoods	<u>38,100 MBM</u>
Total	90,600 MBM

Cordwood Material:

Softwoods	863,000 Cords	(69.0 MM cu. ft.)
Hardwoods	<u>1,325,400 Cords</u>	(<u>106.1 MM cu. ft.</u>)
Total	2,188,400 Cords	(175.1 MM cu. ft.)

Growing Stock 2/:

Softwoods	968,000 Cords	(77.4 MM cu. ft.)
Hardwoods	<u>1,401,600 Cords</u>	(<u>112.2 MM cu. ft.</u>)
Total	2,369,600 Cords	(189.6 MM cu. ft.)

PERIODIC NET ANNUAL GROWTH

Sawlog Material 1/:

Softwoods	2,200 MBM
Hardwoods	<u>5,100 MBM</u>
Total	7,300 MBM

Cordwood Material:

Softwoods	54,600 Cords	(4.4 MM cu. ft.)
Hardwoods	<u>65,400 Cords</u>	(<u>5.2 MM cu. ft.</u>)
Total	120,000 Cords	(9.6 MM cu. ft.)

Growing Stock 2/:

Softwoods	59,000 Cords	(4.7 MM cu. ft.)
Hardwoods	<u>75,600 Cords</u>	(<u>6.1 MM cu. ft.</u>)
Total	134,600 Cords	(10.8 MM cu. ft.)

NET ANNUAL ALLOWABLE CUT

Sawlog Material 1/:

Softwoods	1,150 MBM
Hardwoods	<u>1,740 MBM</u>
Total	2,890 MBM

Cordwood Material:

Softwoods	26,380 Cords	(2.1 MM cu. ft.)
Hardwoods	<u>58,460 Cords</u>	(<u>4.7 MM cu. ft.</u>)
Total	84,840 Cords	(6.8 MM cu. ft.)

Growing Stock 2/:

Softwoods	28,680 Cords	(2.3 MM cu. ft.)
Hardwoods	<u>61,940 Cords</u>	(<u>4.9 MM cu. ft.</u>)
Total	90,620 Cords	(7.2 MM cu. ft.)

1/ Scribner Decimal C. Includes sawlog volume of white and red pine, hemlock, and hardwoods except aspen and balsam poplar. Multiply by 1.15 to convert to Int. $\frac{1}{4}$.

2/ Net volume of all live merchantable trees 5.0" d.b.h. and larger to a variable top diameter inside bark of not less than 4.0". Multiply by 80 to convert to cubic feet.

Ten-Year Plan of Action

Item	:	:	District		
	:	Total	:	:	:
	:	:	Mio	Tawas	Harrisville
			- Acres -		

Periodic Allowable Cut:

Intermediate Cuts	14,000	3,000	7,600	3,400
Preparatory Cuts	20,900	9,700	7,000	4,200
Final Regeneration Cuts	<u>69,300</u>	<u>22,500</u>	<u>16,800</u>	<u>30,000</u>
Total	104,200	35,200	31,400	37,600

Reforestation:

Seeding & Planting	45,000	18,000	6,800	20,200
Regeneration Release	<u>30,000</u>	<u>11,900</u>	<u>4,500</u>	<u>13,600</u>
Total	75,000	29,900	11,300	33,800

Timber Stand Improvement:

Release & Weeding	22,900	4,200	12,000	6,700
Pruning	<u>3,000</u>	<u>1,200</u>	<u>400</u>	<u>1,400</u>
Total	25,900	5,400	12,400	8,100

Property Lines: 30 miles

Right-of-Way: 20 cases

Timber Access Roads: 30 miles

BACKGROUND

General

The Huron working circle dates from February 11, 1909 when President Theodore Roosevelt, by proclamation, created it as the Michigan National Forest. It consisted of 64,758 acres of public domain land in small, scattered blocks along the AuSable River. These blocks provided the nucleus, and in 1936 purchase unit additions increased the gross area to 762,300 acres. This has since been decreased through boundary adjustments to 692,100 acres of which 413,500 acres are now in government ownership (Table 1).

The Michigan National Forest was later changed to the Huron National Forest. It has since been combined with the Manistee to form the Huron-Manistee National Forest.

Government ownership is fairly solid with the exception of land around towns, villages and farming communities. With the present interest in land for other than forestry purposes it appears as if the ownership pattern will remain fairly static.

Table 1. Area of Government land by District, County and Land Class - Huron Working Circle.

		Acres			
District	:	:	Commercial Forest		:
or	:	Total	Regulated	Unregulated	Other
County	:	Area	Working Group	Working Group	
District:					
Mio		149,400	141,300	3,900	4,200
Tawas		113,500	104,400	4,100	5,000
Harrisville		150,600	146,000	2,100	2,500
County:					
Alcona		102,900	99,500	1,500	1,900
Crawford		45,500	44,600	100	800
Iosco		102,400	93,200	4,200	5,000
Ogemaw		19,800	19,500	-	300
Oscoda		142,900	134,900	4,300	3,700
TOTAL		413,500 ^{1/}	391,700	10,100	11,700

^{1/} As of June 30, 1963.

The working circle is divided into two working groups, regulated and unregulated.

The regulated working group contains the land that will be managed for the timber resource as well as all other resources congruent with multiple-use. This plan is essentially for this working group and considers multiple-use needs in the management of the timber resource.

The unregulated working group contains areas with special management plans and the isolated parcels outside the main administrative boundary of the Forest. Two wildlife management units, the Tuttle Marsh and Kirtland Warbler Area, make up the bulk of this group. Experimental plots and recreation sites are also included. No cutting, regeneration or TSI objectives were set for this group for this plan period.

Noncommercial forest and nonforest were classified according to Forest Survey definitions. The nonforest is primarily in roads, firebreaks, and water.

The previous inventory was made in 1950-51 when the Forest was administered as 2 working circles, corresponding to the 2 Districts-Mio and Tawas. The timber management plans resulting from this inventory were in effect from July 1, 1951 to June 30, 1961. Both plans were extended until June 30, 1964. Copies of these plans are on file at each District office and the Supervisor's Office and may be referred to for additional background information. They are to be retained in the active files.

In 1958 the boundaries of the Mio and Tawas Districts were adjusted and a third District - The Harrisville, was created.

This plan will treat the 3 Districts as one working circle and will be administered as such. However, this in no way removes the responsibility from the District Ranger for carrying out this plan as it applies to his District. He will still be the primary agent responsible for carrying out the actual on-the-ground action plan. Significant District data are found in this plan. More detailed data are available in Appendix C (District IBM Summaries) to aid the ranger in fulfilling his obligations.

The 3 Districts or blocks are further divided into compartments. Compartment boundaries within the block are usually streams, roads, lakes, or other features identifiable on the ground. The following summary shows for each of the 3 blocks the number of compartments and the average commercial forest area per compartment in the regulated working group.

<u>District or Block</u>	<u>Number of Compartments</u>	<u>Ave. Commercial Forest Area</u> (acres)
Mio	225	628
Tawas	152	687
Harrisville	<u>211</u>	<u>691</u>
Total	588	666

Physiography

The topography of the Huron working circle is, in general, level to gently rolling, and is no deterrent to logging. The more level areas are parts of outwash and clay till plains and the hills are terminal moraines.

The working circle has no specific topographic features of sufficient importance to influence the management or harvesting of timber. The existing network of roads is such that some portion of nearly every section can easily be reached by motor vehicles.

The AuSable River is the major drainage. It traverses the area from northwest to southeast, flowing through a terraced valley from one to three miles wide and lying from 100 to 400 feet below the highest parts of the upland. Minor drainages are the AuGres and the Pine. Swamps occur infrequently, primarily in basins in the hills and along streams.

Soils vary from sand on the dry pine plains to the organic soils, peat and muck, of the swamps and marshes. Generally, most of the soils are in some degree sandy.

Extremes in temperature of from 110° to -47° have been recorded. However, the mean annual temperature is about 43°. The average annual precipitation of 28 inches, including snow, is fairly well distributed throughout the year, but poorly distributed within any one month. Dry spells do occur infrequently, resulting in losses both to natural and planted reproduction. The growing season is about 115-140 days going from west to east.

Economy and Markets

Being as close to major population centers such as Detroit and Chicago, the areas within and adjacent to the working circle have a highly developed recreation industry. Tourism in the summer, hunting in the fall, and skiing in the winter attract many people from the cities. Several large adjacent communities have considerable industrial development and many residents within the working circle are employed by these industries. Many other local residents supplement their income by woods work of some type. Some farming is carried on.

There are a number of small sawmills which are entirely or partly dependent on National Forest timber. Most of the sawtimber available is of low quality and is used for pallets, crating, and construction.

There are no pulpmills within the working circle but several are within trucking distance so that they play an extremely important part in the marketing of National Forest wood. Presently, the four major pulpwood markets are Abitibi Corp., Alpena; S. D. Warren Co., Muskegon; Packaging Corp. of America, Filer City; and Scott Paper Co., Detroit.

Generally, markets are very good for all products except oak pulpwood.

During the previous plan period a total of 576,600 cords of all products were harvested (F.Y. 1952 through F.Y. 1963). This compares to an allowable cut of 597,600 cords. However, this allowable cut was less than growth and did not include a large amount of dense hardwood cordwood material which was not salable through the plan period.

FOREST CONDITIONS AND CHANGES

General

Data and policies in the following pages will apply only to the regulated working group. Data and policies for the unregulated working group can be found in specific management plans for those areas involved.

Of the 402,020 acres of National Forest land within the regulated working group, 391,740 acres are commercial forest land - that is - land which is producing or is capable of producing crops of industrial wood and is not withdrawn from timber utilization (App. A, Table 1). Less than 2 percent of the commercial forest land is in modified management zones such as road and streamside buffer zones, high hazard erosion areas, etc. Treatment will be modified so that the total yield on some of these acres will be lowered. However, as far as the total working circle picture is concerned it would be affected very little. During inventory, field crews were cognizant of these special areas and data collected on plots falling in them were altered to reflect the management policies in effect at that time.

Forest Types and Stand Size

Well over one-half of the commercial forest land in the regulated working group is in the pine types. Jack pine accounts for about two-thirds of the pine types and covers the greatest area on the working circle. The aspen-birch type is second largest in extent.

Areawise red pine is the third largest. However, in economic importance it far exceeds the two larger types. There are 62,000 acres in this type and for all practical purposes the type is of plantation origin.

The most noticeable changes occurred in the red pine and oak types (Figure 1). Some of it was the result of the conversion of the oak to pine. Some of the decrease in oak area was because of changes in typing specifications - any stand that would be managed for pine was typed as pine even though the oak might have been predominant. This is born out by the volume data. The oak volume is a greater proportion of the total volume now than it was in 1952. The aspen-birch and jack pine types increased slightly in area.

Almost two-thirds of the commercial forest land in the regulated working group is in pole timber, 30 percent in restocking, $2\frac{1}{2}$ percent in sawtimber and 3 percent is nonstocked. The non-stocked area includes only land units at least $2\frac{1}{2}$ acres in extent. Smaller non-stocked areas are not delineated and measured.

Although the size class distribution is a distinct improvement over 1950, considerable improvement is still necessary before it is desirable (Figure 2). Assuming the present forest type distribution as satisfactory, roughly one-third of the commercial forest area should be in each size class. The conversion to longer-lived species, which is desirable for about 80,000 acres, would require a larger part in sawtimber stands to make the distribution favorable.

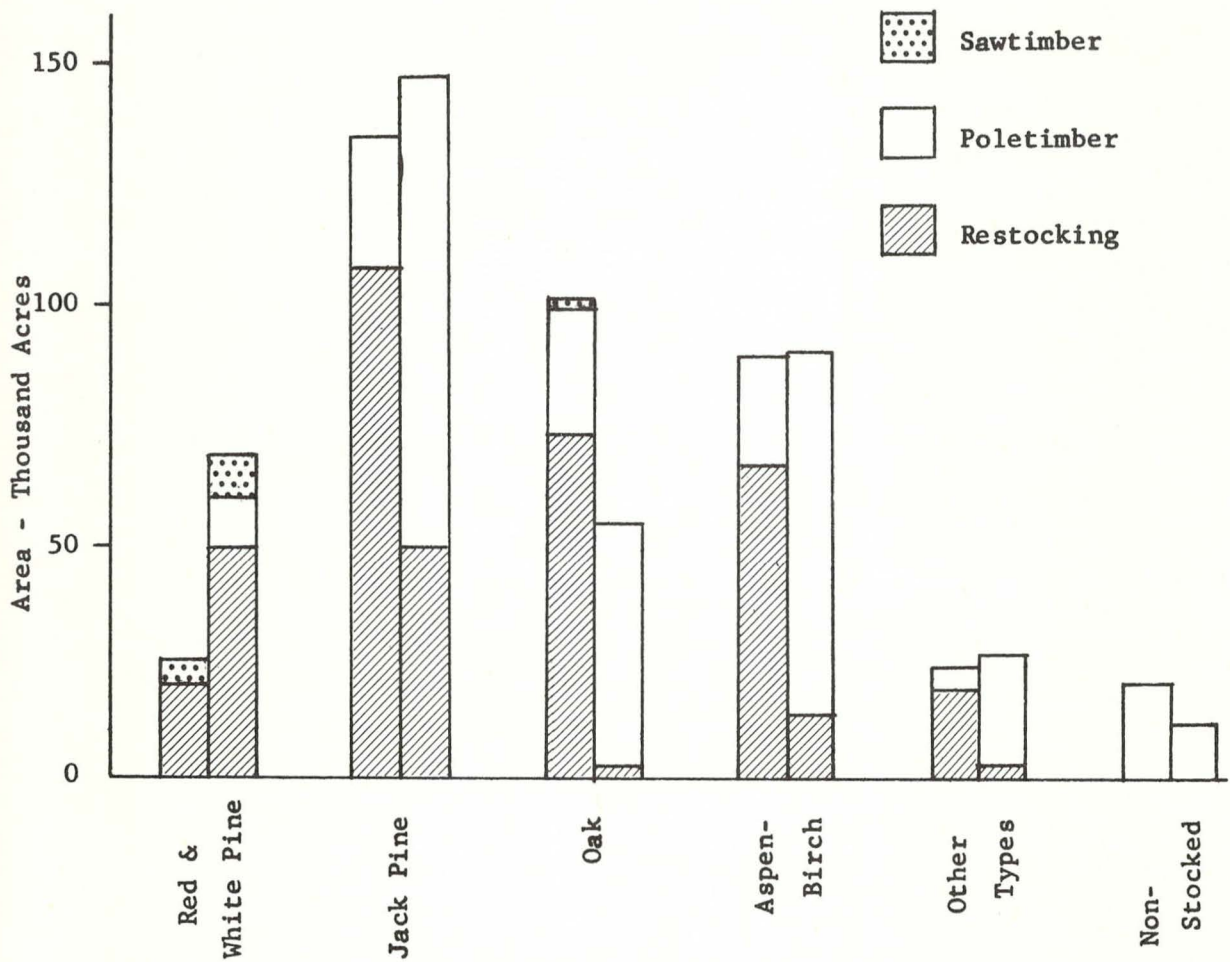


Figure 1. Comparison of Commercial Forest Land in the Regulated Working Group Between 1952 and 1964 By Forest Type & Stand Size Class.

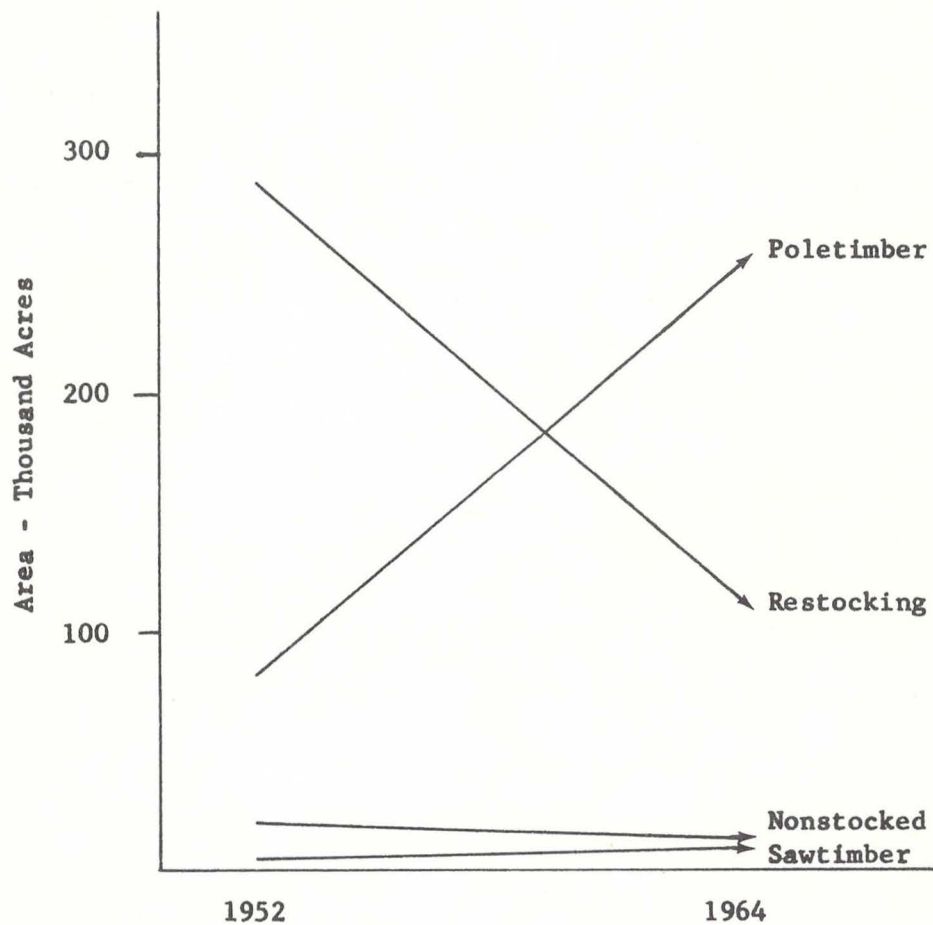


Figure 2. Comparison of Commerical Forest Area in Regulated Working Group Between 1952 & 1964 By Stand Size Class.

The area of nonstocked shows a downward trend over the 14-year period. Some of the remaining 11,400 acres of nonstocked will be left in this condition for other uses.

Red and white pine sawtimber area almost doubled between periods, going from 4,000 acres to almost 7,500 acres.

Age

This forest is predominately a young forest. Over four-fifths of the area is stocked with trees of less than rotation age and only 2 percent can be considered as over-mature (Table 2). The over-mature timber is in the less merchantable types.

Considering the working group as a whole the desirable distribution of 84 percent immature and 16 percent mature for all types is almost the same as the actual average. However, numerous inconsistencies exist for individual types so that a total working group comparison is misleading. For instance, the pine types which comprise 213,000 acres should have 31,000 acres in mature timber during this plan period. They presently have only 10,200 acres. On the other hand, aspen has a higher proportion of mature and over-mature age classes than is desirable.

Table 2. Proportion of Forest Area by Forest Type and Age Groups - Regulated Working Group.

Forest Type	Age Group			:Desirable
	:Immature	:Mature ^{1/}	:Over-mature	: Mature
	- Percent -			
White & Red Pine	100	*	*	7
Jack Pine	91	9	-	18
Swamp Conifers	76	16	-	11
Oak	87	13	*	16
Aspen-Birch	56	38	6	23
Other types	94	3	3	10
Average - All types	83	15	2	-
Desirable - All types ^{2/}	84	16	-	16

* Minor amounts.

^{1/} Rotation plus 10 years.

^{2/} Assuming present type distribution is satisfactory.

Site

The vast majority of stands on the Huron occupy medium sites. Only 11 percent of the stocked commercial forest land is good site and almost 15 percent is poor site (Table 3). Most of the good sites are in aspen-birch stands and swamp conifers. Some of the good site aspen-birch will be converted during this plan period to spruce, if the site is wet, and red or white pine, if dry. Much of it will be kept in aspen production.

Table 3. Area of Stocked Commercial Forest Land by Forest Type & Site Classes - Regulated Working Group.

(Thousand Acres)					
Forest Type	:	Total	Site Class		
			Poor	Medium	Good
White & Red Pine	:	67	10	53	4
Jack Pine	:	146	2	142	2
Swamp Conifers	:	16	*	4	12
Aspen-Birch	:	89	17	52	20
Other	:	62	27	30	5
All Types	:	380	56	281	43
Percent	:	100	15	74	11

* Less than 500 acres.

Mean annual increment potential for all types combined is almost 60 cubic feet per acre (Table 4). To achieve this would require full stocking and rotations coinciding with the culmination of mean annual increment. This is also based on the species presently occupying the sites. Conversion to more productive species on sites which now support poor species will increase the figure of 60 cubic feet. However, present multiple use practices and sawtimber rotations will result in a decrease in sustained yield. The net result will be a productivity of about 55 cu. ft. per acre per year. Present periodic net annual growth is 28 cubic feet per acre.

Table 4. Proportion of Timbered Commercial Forest Land by Forest Type & Site Capability Classes - Regulated Working Group.

Forest Type	Site Capability Classes - MAI ^{1/}			
	20-39	40-59	60-79	80+
(Percent)				
White & Red Pine	-	-	1	99
Jack Pine	3	97	-	-
Aspen-Birch	-	23	54	23
Misc. Softwoods	83	13	2	2
Misc. Hardwoods	71	12	10	7
Average - All Types	16	45	15	24

^{1/} Mean annual increment in cubic feet per acre.

Area Condition Class

Over one-fifth of the commercial forest land is at least 70 percent stocked with desirable trees, over two-fifths is between 40 and 69 percent stocked, and less than two-fifths is less than 40 percent stocked (Table 5). Much of the poorly stocked area is in the oak type (included in the miscellaneous hardwood) which alone accounts for over 32,000 acres. Although both the jack pine and aspen types have a combined area of 81,000 acres in an undesirable condition, some of it is due to the age of the timber.

Table 5. Area of Commercial Forest Land by Forest Type & Percent Stocking of Desirable Trees - Regulated Working Group.

(Thousand Acres)				
Forest Type	Total	Percent Stocking of Desirable Trees		
		70%+	40-69%	0-39%
White & Red Pine	67	17	41	9
Jack Pine	146	36	69	41
Aspen-Birch	89	16	33	40
Misc. Softwoods	16	6	6	4
Misc. Hardwoods	62	7	18	37
Nonstocked	12	-	-	12
All Types	392	82	167	143

Out of 143,000 acres less than 40% stocked with desirable trees, 30% will have either a regeneration or intermediate cut, 33% will be planted or T.S.I.'d or both, and 40% will not be treated (Table 6). Additional planting after regeneration cutting is not included in the 33% quoted previously.

Table 6. Area of Commercial Forest Land by Treatment & Percent Stocking of Desirable Trees.^{1/} Regulated Working Group.

(Thousand Acres)				
Treatment	Total	Percent Stocking of Desirable Trees		
		70%+	40-69%	0-39%
Regeneration Cut	69	*	30	39
Intermediate Cut	35	14	15	6
TSI	26	1	20	5
Planting	49 ^{2/}	-	7	42
No Treatment	221	67	97	57
All	392	82	167	143

* Less than 500 acres.

^{1/} Table will not add vertically since more than 1 treatment will be made on the same acres.

^{2/} Does not include acres to be planted after regeneration cutting.

Timber Volume

There are 2,369,600 cords of growing stock on the timbered commercial forest land within the regulated working group. It consists of the following material:

Cordwood Material:

Poletimber Trees	1,832,300 Cords
Sawtimber Size Trees	291,700 Cords
Topwood	64,400 Cords
Sawlog Material <u>1/</u> :	90,600 MBM
Growing Stock:	<u>2,369,600 Cords</u>

The volume of topwood pertains only to the cordwood material in the tops of sawlog species. It does not include limbs.

* Although the proportion of growing stock in poletimber (77%) will always be significant because of the short-lived species on this working circle, it is imperative that the proportion in sawlog material be increased to meet future needs of the American people. The primary management objectives here will be not only to convert much of the present acreage to long-lived species such as red pine but also to maintain the present stands in such condition so as to produce the highest yields of sawlog material consistent with multiple use.

Aspen, jack pine and oak each account for about one quarter of the growing stock volume and together account for over three-fourths of the total (Table 7). Red and white pine and oak are the main sawlog species. Combined they make up over 90 percent of the sawlog material.

1/ White pine, red pine, hemlock and hardwoods except aspen and balsam poplar.

Table 7. Total Net Volume of Growing Stock & Sawlog Material on Timbered Commercial Forest Land by Species or Species Group - Regulated Working Group.

<u>Species</u>	<u>Growing Stock (Cords)</u>	<u>Sawlog Material (MBM)</u>
Red & White Pine	215,900	51,500
Jack Pine	609,100	-
Cedar	67,800	-
Misc. Softwoods	75,200	1,000
Aspen	605,100	-
Oak	599,900	32,400
Northern Hardwoods <u>1/</u>	95,500	2,700
Misc. Hardwoods	101,100	3,000
All Species	2,369,600	90,600

1/ Maple, beech, yellow birch, and basswood.

Total growing stock volume on all commercial forest land within the working circle increased 53 percent during the 12-year period between 1952 and 1964. This is over and above the drain from cutting and amounts to a net annual increase of 4.4 percent. Total drain for this period amounted to 576,600 cords. In the 1952 plan periodic annual growth of growing stock was estimated to be 118,600 cords. By adding 12 years' growth to the 1952 volume of 1,576,800 cords and subtracting the cut or drain, the result is 2,423,400 cords. This compares very favorably with the 2,421,800^{1/} cords arrived at from the 1963 inventory.

Both aspen and the oaks showed a sharp increase in growing stock volume (Figure 3). The aspen volume more than doubled while the oaks increased 60 percent. Unfortunately some of this increase was made at the expense of the more valuable species. In 1952 oak and aspen accounted for only 42% of the growing stock. They now account for 51 percent. The pines increased 130,000 cords or 18 percent over the 1952 volume. This is disappointing when compared to the less valuable species such as oak and aspen. However, this low increase was expected because (1) management policy is to convert better site jack pine to red pine and (2) removal of old growth residual stands of red and white pine, and (3) the heavy cutting in jack pine. The anticipated increase during this plan period will be much more significant.

Total sawlog material increased from 83,600 to 92,500 MBM on all commercial forest land. Here again, the oaks showed the highest increase. Red and white pine sawlog material decreased because of the liquidation of most of the old growth residual trees and stands on the working circle.

1/ Total net volume on all commercial forest land within the working circle.

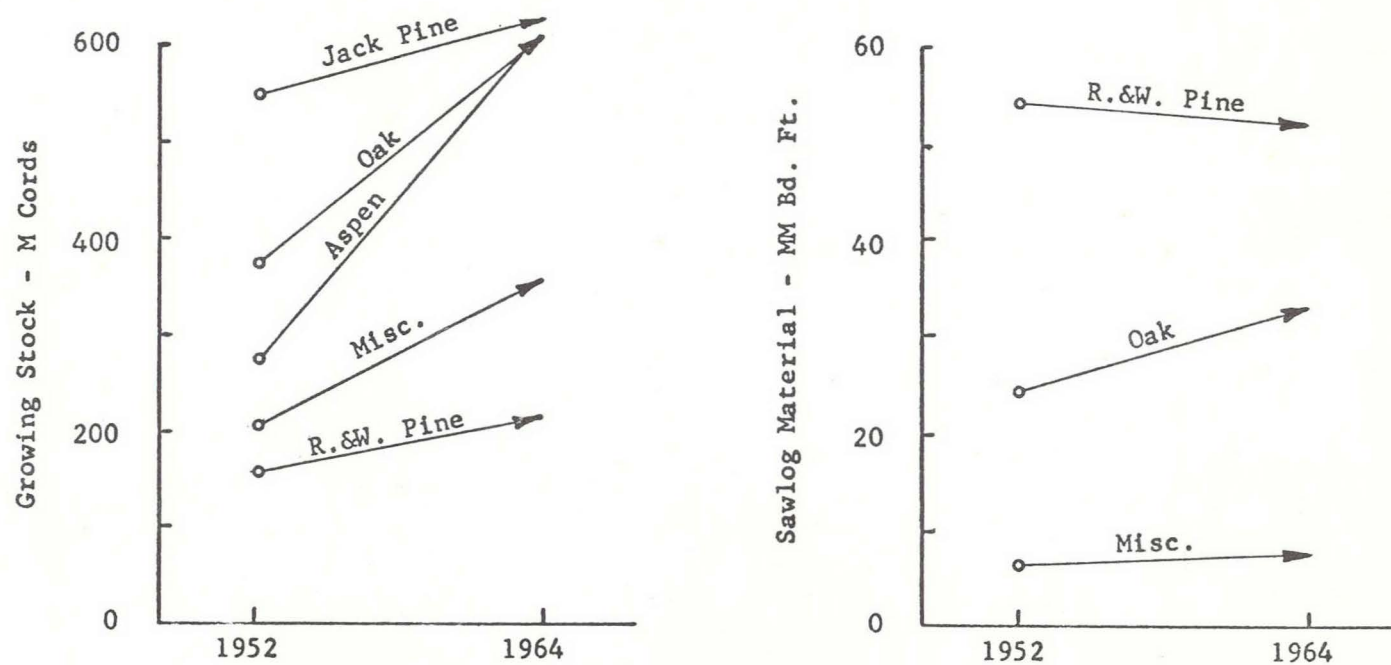


Figure 3. Net Changes in Growing Stock & Sawlog Material Between 1952 & 1964. All Working Groups.

Growth

Total periodic net annual growth amounts to 134,600 cords of growing stock, including 7,300,000 board feet of sawlog material and 120,000 cords of cordwood material (Table 8). This is equivalent to 5.7 percent of the total growing stock volume and 8.1 percent of the sawlog volume.

Ingrowth of saplings into the poletimber size class accounts for 48,500 cords or over one-third of the total growing stock growth. Likewise, sawlog ingrowth - growth of pole-sized trees into sawtimber size - accounts for over two-thirds (5,000,000 feet) of the total sawlog growth.

The combined growth of oak, jack pine, and aspen accounts for well over two-thirds of the total growth.

* Average periodic net annual growth of timbered commercial forest land amounts to only 0.35 cords per acre as compared to a mean annual increment potential (site capability) of 0.75 cords per acre. This, along with the area condition class data, points up the need for positive action in improvement of stand conditions for both growth and quality. Unless this is done the working circle will not be in a position to contribute its share in meeting the resource needs of the region and nation.

Table 8. Total Periodic Net Annual Growth of Growing Stock & Sawlog Material on Timbered Commercial Forest Land by Species or Species Groups - Regulated Working Group.

<u>Species or Species Group</u>	<u>Growing Stock (Cords)</u>	<u>Sawlog Material (MBM)</u>
Red & White Pine	18,900	2,200
Jack Pine	33,900	-
Cedar	4,000	-
Misc. Softwoods	2,200	*
Aspen	22,500	-
Oak	37,600	3,800
Northern Hardwoods <u>1/</u>	10,900	900
Misc. Hardwoods	4,600	400
All Species	134,600	7,300

* Less than 50 MBM.

1/ Maple, beech, yellow birch & basswood.

The growth of oak is greater than that of any other species and with the limited market for oak, strenuous stand improvement measures will be needed to prevent a further sharp buildup of oak growing stock through this plan period.

Total growing stock growth is half again larger than the allowable cut while the growth of sawlog material is $2\frac{1}{2}$ times larger. This is to be expected, and necessary, since the majority of the stands are young and are at a period of "building" growing stock.

The allowable cut of aspen growing stock is greater than its growth, due primarily to the high proportion at or near rotation age (Figure 4). However, for red and white pine, growth is 6 times larger than the allowable cut.

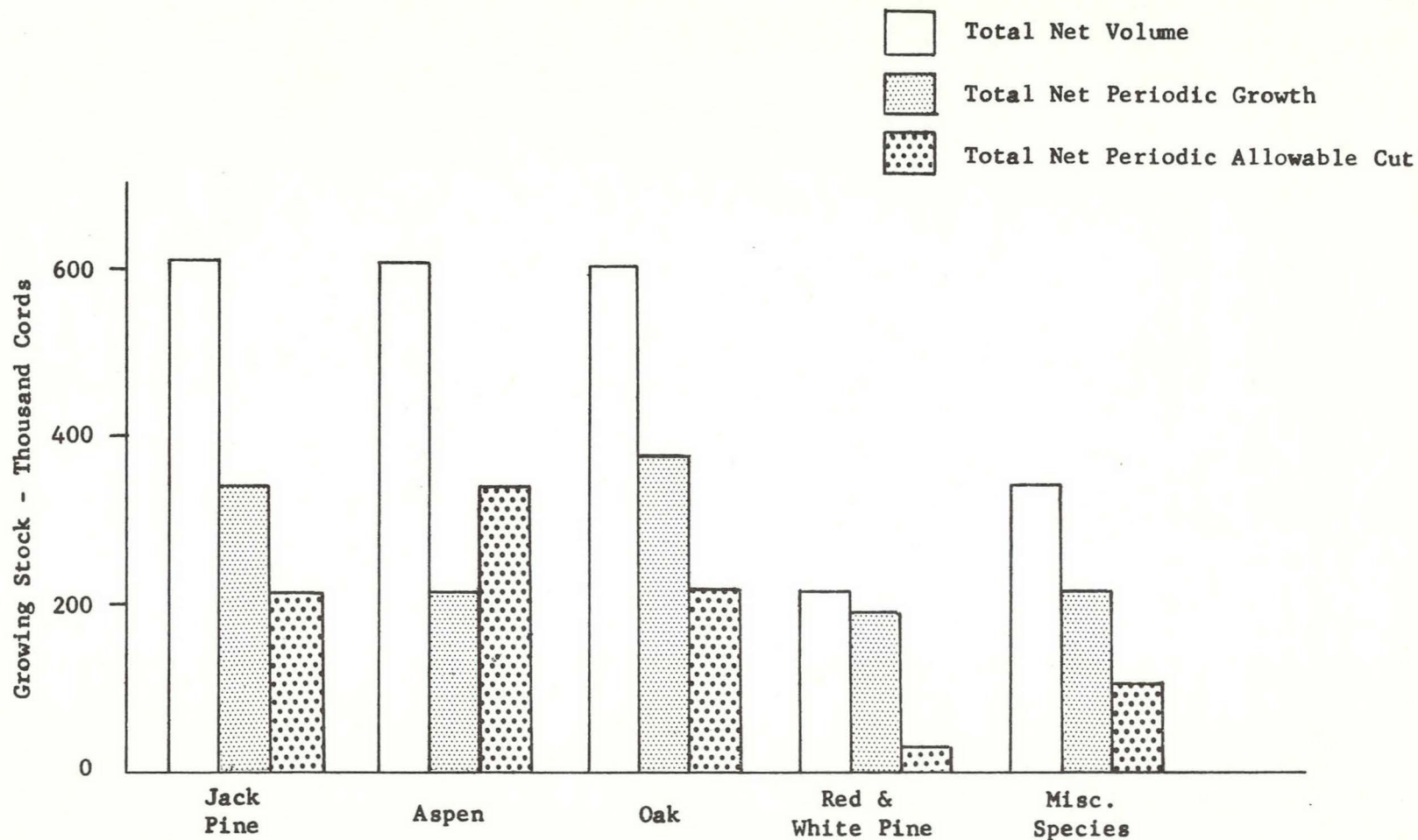


Figure 4. Total Net Volume, Periodic Growth & Allowable Cut of Growing Stock By Species or Species Groups.

PAST TIMBER MANAGEMENT

Timber Harvest

The annual allowable cut area was set at 19,175 acres in the previous plan. The estimated volume to be cut from this area was 49,800 cords. Actual cut averaged 48,100 cords annually or 97 percent of the allowable.

Only 3 percent of the actual cut volume was sawlog material.

The actual cut has shown a relatively steady increase over the last 20 years (Figure 5). This is expected to continue.

Seeding & Planting

During the past decade there has been a sharply increased planting and seeding program. As of July 1, 1963, established plantations amounted to 130,815 acres. Of this total, 29,189 acres were established during the last plan period. Approximate species composition for trees planted was 98 percent red pine, 1 percent jack pine, and 1 percent white pine.

Timber Stand Improvement

Release and weeding work was accomplished on 55,469 acres since July 1, 1951. Of the 55,469 acres 36,064 acres were plantation release which includes regeneration release. Pruning was done on 1,255 acres.

Roads

The planned primary road system is 1,011 miles. Of this, 856 miles have been completed. Forty miles were completed during the last plan period.

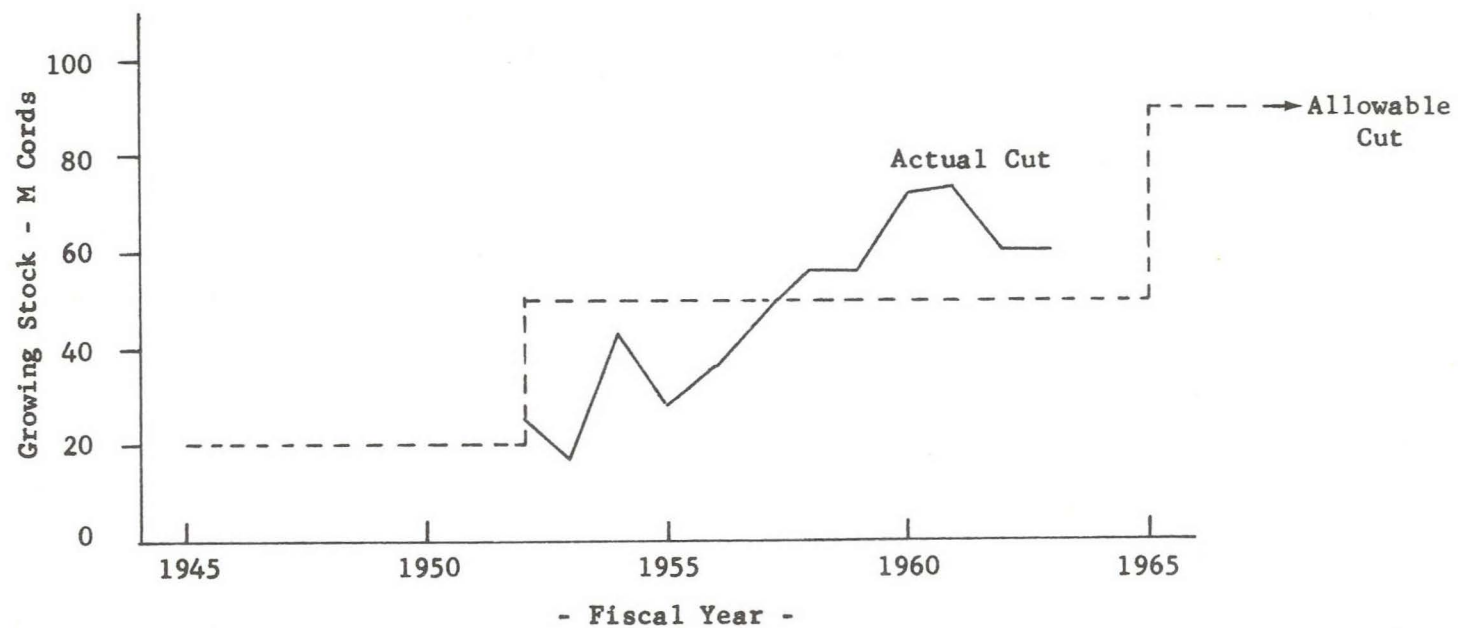


Figure 5. Actual & Allowable Cut of Growing Stock By Year.

Protection

A complete picture of the fire protection trend can be obtained from an analysis of the District fire plans. Average area burned for the last 5 years is 91 acres per year.

Insect damage, for the most part, has been confined to the mature and over-mature jack pine. The primary agent has been the jack pine budworm (Choristoneura pinus). Because of the low volumes and value per acre, the only practical control has been the removal or salvage of the infested timber. Other insects which have been problems at times are:

1. White pine weevil, (Pissodes strobi). The white pine weevil is commonly found in white, jack and red pine plantations. No mortality occurs, but crooks and growth reduction results. Attacks have been most severe in open-grown white pine and jack pine plantations located in old fields which once supported northern hardwoods. No practical control measures are known but damage is usually reduced when a light over-story of hardwoods is maintained, particularly so in white pine plantations.
2. There has been a considerable infestation of Saratoga spittlebug, (Aphrophera saratogensis), particularly on the Harrisville District. During the summer of 1963, 4,250 acres were sprayed and in 1961 and 1962 about 1,100 acres.
3. Red-headed pine sawfly, (Neodiprion lecontei), and the forest tent caterpillar, (Malcosoma disstria) have been observed from time to time but have caused no serious losses.

White pine blister rust, (Cronartium ribicola), is the only disease for which expenditures were made during the last plan period. As of December 31, 1963 the status of the control area on National Forest lands was as follows:

Worked initially	- 16,250 acres
On maintenance	- 10,675 acres
Total control area is	- 17,800 acres

Infection on white pine is found generally throughout the working circle except rarely in the ribes-free types such as oak.

Plan of Action

Management Objectives

The overall objective shall be to manage the timber resource in such a manner as to produce the optimum quantity and best quality wood consistent with other uses as provided for in the Regional Multiple-Use Guide and the Ranger District Multiple-Use Plan. It is essential that an adequate timber resource be maintained to provide a steady supply of wood not only for the present wood-using industries but also for new industries which will be necessary if the wood requirements of a rapidly expanding population are going to be met. The achievement of this goal will be met by the following objectives:

1. To establish the highest quality stands through natural regeneration, seeding, and planting in conformance with the regional tree improvement program.
2. To reforest and manage areas of economic size. To prevent fragmentation of any stands less than 40 acres in extent.
3. To intensively manage immature red and white pine stands on medium and good sites through both commercial and noncommercial stand improvement practices.
4. To convert poor quality oak stands to pine if the potential site index for pine is 50 or more and if it is consistent with M. U. management.
5. To provide adequate insect and disease control to those areas where it is economically feasible and biologically acceptable.
6. To develop a system of primary haul roads where they are now inadequate.
7. To harvest mature timber stands before decadence and resultant economic loss of the resource occurs.

Reforestation

There are an estimated 49,000 acres needing either full or reinforcement planting or seeding (Table 9). Of this area, 8,500 acres are presently nonstocked or less than 10% stocked with growing stock trees and the remaining 40,500 acres have stocking of some kind, but of insufficient quantity or quality to produce any resemblance to a fully stocked stand.

In addition, there will be an estimated 24,500 acres needing reforestation after harvest cutting during this management plan period if the allowable cut is met (Table 10). Of this acreage, only 1,400 acres is to be planted or seeded to the same species as now occupy the site. For instance, of the 18,100 acres of harvest or regeneration cut scheduled for the jack pine type, 800 acres will need to be planted or seeded to maintain the jack pine type, and about 5,000 acres should be planted or seeded to red pine. In the oak type 15,200 acres are scheduled for harvest cutting. Almost all of this acreage (14,200 acres) is to be converted to pine.

The work on the 24,500 acres in table 10 will be financed through K-V funds to the fullest extent. The largest planting job will be on the Harrisville District and the smallest on the Tawas District (Table 11).

Table 9. Area of Commercial Forest Land Needing Reforestation by Land Class, Type of Planting & District - Regulated Working Group.

District & Land Class	:	Total	:	Type of Planting	
				Full	: Reinforcement
- Acres -					
Mio:					
Nonstocked		2,900		2,900	-
Poorly Stocked		15,600		11,100	4,500
Tawas:					
Nonstocked		-		-	-
Poorly Stocked		9,300		6,700	2,600
Harrisville:					
Nonstocked		5,600		5,600	-
Poorly Stocked		15,600		13,900	1,700
All Districts:					
Nonstocked		8,500		8,500	-
Poorly Stocked		40,500		31,700	8,800
TOTAL		49,000		40,200	8,800

Table 10. Area of Commercial Forest Land Needing Reforestation
After Harvest Cutting by Present Forest Type &
Management Objective - Regulated Working Group.

Present Forest Type	: Forced Type Maintenance	: Convert to Red Pine
- Acres -		
White Pine	600	-
Jack Pine	800	5,000
Oak	-	14,200
Aspen	-	3,900 <u>1/</u>
Total	1,400	23,100

1/ Includes small acreage of "convert to spruce".

Most of the large, open areas have been planted. The remaining areas in need of planting or seeding are more difficult and costly to reforest. Therefore, reforestation priorities will be established on the basis of the highest site potential. In all types of reforestation as large a contiguous area as possible, preferably 40 acres or more, should be treated at one time.

The planned planting program for Fiscal Years 1965 through 1969 is as follows:

<u>Fiscal Year</u>	<u>Estimated Area</u>
1965	2,800 acres
1966	3,000 acres <u>1/</u>
1967	3,300 acres <u>1/</u>
1968	3,700 acres
1969	<u>4,000</u> acres
Total	16,800 acres

<u>Species</u>	<u>Percent</u>
Red Pine	94%
White Pine	3%
White Spruce	<u>3%</u>
Total	100%

1/ Present nursery production is geared to somewhat less acres than this so that outside purchases or a larger seeding program may be necessary to meet these goals.

The program after 1969 will be to reforest through seeding and planting at least 5,300 acres annually. Of this, a minimum of 5,000 acres will be planted. The seeding goal will be 300 acres annually. Should direct seeding methods become more successful the reforestation objective will be increased accordingly.

Table 11. Area of Commercial Forest Land Needing Reforestation by District - Regulated Working Group.

District	Reforestation Needs	
	Nonstocked and	After Harvest Cutting
	Poorly Stocked Area	
- Acres -		
Mio	18,500	11,200
Tawas	9,300	3,100
Harrisville	<u>21,200</u>	<u>10,200</u>
Total	49,000	24,500

For the 10-year plan period the estimated regeneration release needs of presently established and new regeneration amounts to 30,000 acres (Table 12).

Table 12. Regeneration Release Needs by Districts - Regulated Working Group.

District	Present Regeneration	New Regeneration
	Release Needs	Release Needs
- Acres -		
Mio	1,200	10,700
Tawas	1,200	3,300
Harrisville	<u>1,100</u>	<u>12,500</u>
Total	3,500	26,500

All planting, seeding, and regeneration release will be done in accordance with FSM 2465 and FSH 2-2465.5.

Timber Stand Improvement

Highest priority will be given to the release of established stands of red and white pine. This will involve primarily oak and aspen removal. There are 26,400 acres needing some type of release or weeding. About 3,000 acres need pruning (Table 13).

Table 13. Timber Stand Improvement Needs by District and Kind of TSI - Regulated Working Group.

District	: : Release and : Weeding	: : Pruning
- Acres -		
Mio	4,200	1,200
Tawas	12,000	400
Harrisville	<u>6,700</u>	<u>1,400</u>
Total	22,900	3,000

Sale areas will receive as much treatment as possible under the K-V program. Other areas will be treated with P&M funds as they become available.

All timber stand improvement work will be done in accordance with FSM 2470.

Property Lines and Rights-of-Way

A major problem in the harvest of the timber resource is the determination of property lines between government and other land. An estimated 30 miles of property lines will need to be established during the plan period.

The rights-of-way requirements for the next 3 years are as follows:

Fiscal	:	No.	:	Estimated
Year	:	Cases	:	Cost
1965		2		\$ 200
1966		2		\$ 200
1967		2		\$ 200

For individual cases refer to the Forest right-of-way plans.

Roads

During the next 10 years an estimated 40 miles of land access roads should be constructed to provide access to most of the working circle. Approximately 30 miles of land access roads will be needed to harvest the allowable cut. The working circle objective is to construct 3 miles of timber access roads each year during the plan period. The estimated annual cost to the Forest Service is \$25,000.

Roads constructed by purchasers of National Forest timber will be on approved locations and standards of construction will be based on the permanency and expected use of the roads. Roads will be built on permanent summer haul locations insofar as possible.

Protection

The objective will be to reduce insect and disease damage to the Forest. Timber management measures to maintain healthy, vigorous stands are essential to minimize volume losses from these causes.

1. Insects - A variety of insect pests occur on the working circle. However, only one - the jack pine budworm, is in sufficient numbers to be classified as epidemic. Present control methods are primarily the salvage or removal of mature and over-mature trees. This will continue until a better control method is devised.

White pine weevil is present in almost all pine plantations. It is most serious in white pine stands where the infestation many times leaves the tree completely worthless for commercial timber products. Overhead cover should be maintained for all white pine stands less than 25 feet tall. This offers some success and at present appears to be the only practical control.

Saratoga spittlebug control will continue and aerial spraying will be carried on where applicable.

Pest detection and control methods for these and other insects are specified in FSM 5200.

Control measures will be guided by the Forest entomologist.

2. Diseases - White pine blister rust is present over most of the Forest. Most of the control area has been worked over and about 60 percent is now on a maintenance basis.

Following is the control area, and cost, to be worked during Fiscal Years 1965-1968: (Includes both initial and maintenance.)

Fiscal : Year :	Area	: :	Cost
1965	2,900 acres		\$ 1,000
1966	1,800 acres		900
1967	1,300 acres		700
1968	1,500 acres		300

No attempt shall be made to maintain or propagate white pine in high risk blister rust areas until rust-resistant strains are available. However, where the risk is low every effort should be made to maintain and manage the present white pine stands. Blister rust control is a justifiable management cost since the returns from white pine can be considerably higher (if other silvicultural treatments are carried out) than for any other species on the working circle. Therefore, an immediate objective will be to determine by field examination and survey data which areas are to be managed for white pine. Final determination of whether or not an area is to be retained on maintenance or dropped from control will be based on guidelines established in BRC Handbook and White Pine Management Guide. Disease detection and control measures are found in FSM 5200.

To provide adequate insect and disease detection and control this program is to be followed:

1. Hold training sessions to train Forest personnel to recognize damaging insects and disease.
2. Apply biologically acceptable control measures as rapidly as economics permit.
3. Avoid site and tree damage in logging operations.
4. Remove high risk trees whenever feasible to eliminate potential sources of infestation.
5. Follow Regional tree improvement program requirements in reforestation.
6. Alter stand composition or density to discourage pest problems.
7. Encourage large-stand management. Large stands can be protected more economically than many small, scattered stands.

Management Plan Controls

The compartment will be the basic unit for all record keeping. Reforestation, TSI projects, and timber sales should be noted on the compartment inventory record (R9-2410-7). The treatment or activity along with its date can be recorded in the "remarks" column. Summary data will be maintained as prescribed in the FSM.

An essential feature of compartment management is the completion of all timber harvest and other cultural activities once the compartment has been entered. When a sale is made in a compartment, all other sales expected in that compartment during the plan period will

also be made. It is realized that some stands may be cut as much as 5 years before rotation age (by the same token some will be held 5 years beyond) but it is extremely important that management be on a systematic and orderly basis. "Stand" management is expensive, tends to be haphazard, and is extremely inefficient. Before a compartment is closed all TSI, planting, seeding, or other cultural activity for which finances are available should also be completed.

Normally deviation from this practice will only occur to take advantage of special market circumstances or to avoid unusual losses from insects, disease, or other causes.

Allowable Cut

The annual allowable cut area consists of 1,400 acres of intermediate cuts, 2,090 acres of jack pine preparatory cuts, and 6,930 acres of regeneration cuts which include all stand clearcuts and the removal cuts in jack pine (Table 14 and Table 7 Appendix A). Careful record keeping will be necessary to maintain control of the preparatory and removal cuts in jack pine. Therefore, when the decision is made to make a preparatory cut, it will be so noted on compartment inventory record R9-2410-7 and the acreage reported as it is cut. When the residual overwood is removed in about 10 years, the area will be reported in the regeneration cut category.

Table 14. Annual Allowable Cut Area by Timber Type & Kind of Cut - Regulated Working Group.

Type	Total	Kind of Cut		
		Inter- mediate	Preparatory	Final Regeneration
			-Acres-	
White & Red Pine	980	950		30
Jack Pine	3,970	70	2,090	1,810
Oak	1,570	50		1,520
Aspen-Birch	3,230	-		3,230
Other Types	<u>670</u>	<u>330</u>		<u>340</u>
Total	10,420	1,400	2,090	6,930

The cut was determined primarily on the basis of silvicultural needs as determined on the inventory sample stands. Because of an unbalanced age class distribution, however, it was necessary to modify the field estimated cut for some types. The following rotation ages will be used as guides:

<u>Type</u>	<u>Poor Site</u>	<u>Medium & Good Sites</u> (Years)
Jack Pine	55	55
Red & White Pine	140	140
Swamp Conifers	80	100
Aspen-Birch	35	45
Oak <u>1/</u>	-	80
Northern Hardwoods	-	100

1/ Oak and northern hardwood stands will be managed for hardwoods only on good sites. If the stand is poor or medium site it will be cut, as soon as it contains a sufficient quantity of merchantable material to be salable, and converted to pine.

The appendix contains a prescription key for jack pine which ties in with the Timber Management Guide. This was used by the inventory crew in determining the prescription and should also be used by District personnel in compartment examination work. Other Regional Timber Management Guides will be used for the other types.

Figures 6-9 show the age class distribution for specific forest types or type groups as well as the allowable cut area by age classes. As an example, Figure 7 shows that there are 53,300 acres in the 41-50 year age class and of this about 17,500 acres should have an intermediate cut. In the 50+ age group, of which there are 25,500 acres, 18,100 acres are recommended for regeneration cutting, 3,700 acres for intermediate cuts, or a total of 21,800 acres with some kind of cut. The remaining 3,700 acres either have a longer rotation (aesthetic areas, etc.) or are inoperable.

The oak type has regeneration cuts starting in the 41-50 age class while the rotation age is 80 years. These areas being cut are poor or medium sites and are to be converted to more valuable species.

The allowable cut volume is estimated to be 90,620 cords of growing stock annually (Table 15). This includes 2,890,000 board feet of sawlog material and 84,840 cords of cordwood material (Appendix A, Table 8.). Three-fourths of the growing stock will come from regeneration cuts (Appendix A, Table 9.).

Most of the allowable cut growing stock volume is aspen - over one-third of the total. Aspen, jack pine and oak combined, account for 85% of the growing stock. Sawlog material is almost 90% oak and red and white pine.

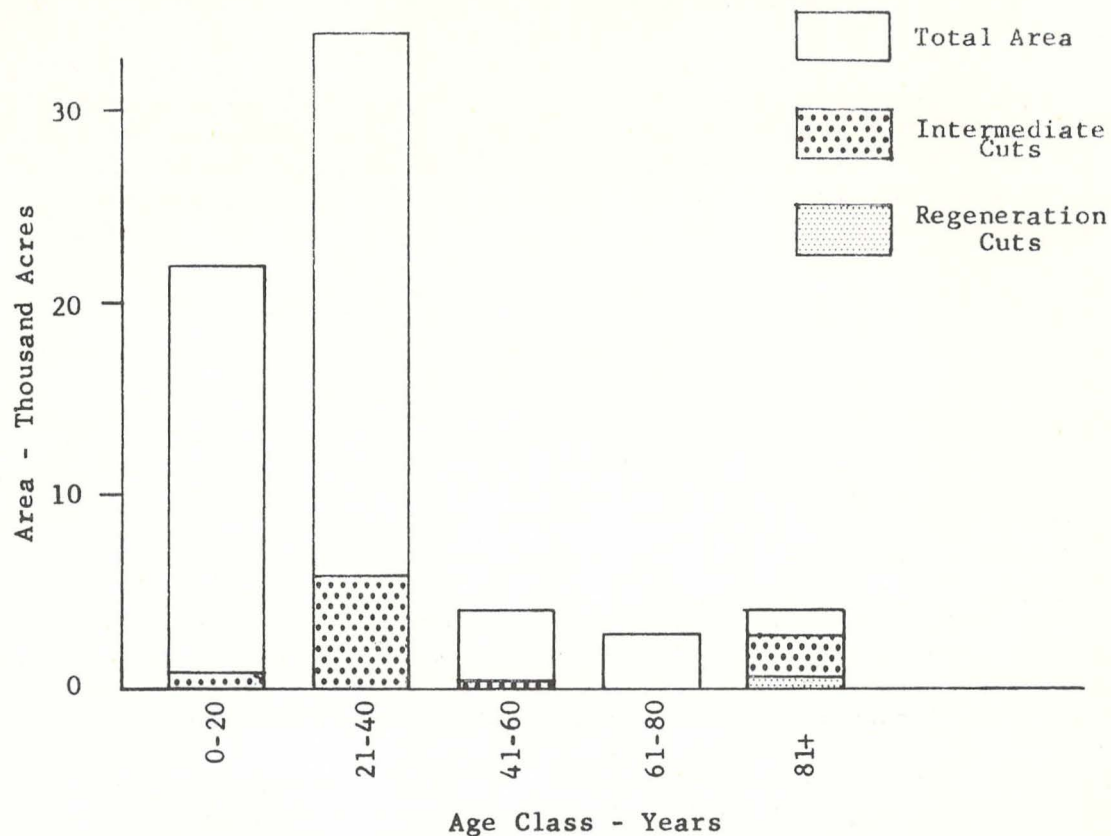


Figure 6. Total Area & Allowable Cut Area of the Red & White Pine Types by Age Classes.



Figure 7. Total Area & Allowable Cut Area of the Jack Pine Type by Age Classes.

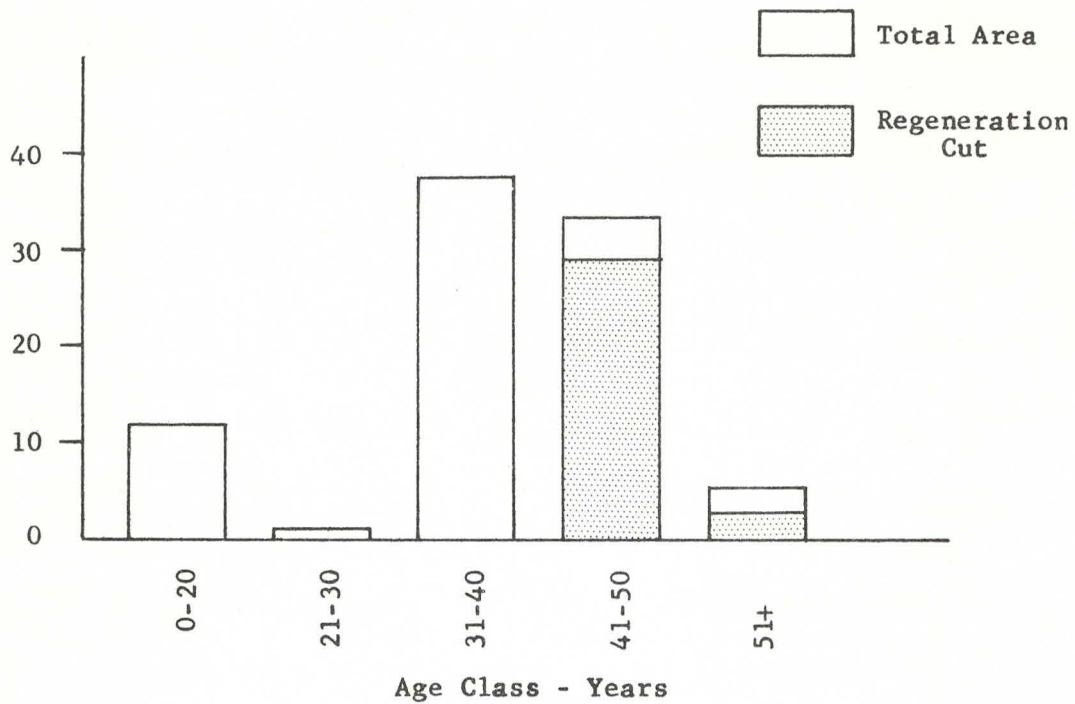


Figure 8. Total Area & Allowable Cut Area of the Aspen-Birch Type by Age Class.



Figure 9. Total Area & Allowable Cut Area of the Oak Type by Age Class.

The cut volume increased significantly between the two plan periods - from 57,500 to 90,620 cords. By certain species the changes were as follows:

Net Annual Allowable Cut of Growing Stock - Cords			
Species	1952 - 1964	1965 - 1974	
Jack Pine	32,600	21,450	
Aspen	10,300	33,930	
Red & White Pine	500	3,090	
Oak	<u>5,800</u>	<u>21,680</u>	
All Species	57,500 <u>1/</u>	90,620	

1/ Includes volumes of species which were unregulated in the last plan.

Table 15. Total Net Annual Allowable Cut Volume of Growing Stock & Sawlog Material by Species or Species Group - Regulated Working Group.

Species	Growing Stock (Cords)	Sawlog Material (MBM)
Red & White Pine	3,090	1,050
Jack Pine	21,450	-
Cedar	2,150	-
Misc. Softwoods	1,990	100
Aspen	33,930	-
Oak	21,680	1,530
Northern Hardwoods <u>1/</u>	2,330	80
Misc. Hardwoods	<u>4,000</u>	<u>130</u>
All Species	90,620	2,890

1/ Maple, beech, yellow birch, and basswood.

The jack pine was the only species showing a significant decline. This was expected since a salvage program to remove scattered overwood has been in progress. This has been necessary not only to release valuable red pine understories but also to reduce sources of jack pine budworm infestation and salvage potential mortality. The pine cut will increase considerably after this plan period (Table 16). District allocation of the allowable cut area and volume is shown in Tables 7 and 9 of the Appendix A.

Compartments scheduled for Fiscal Years 1965-1967 are included in the action plan. This 3-year schedule will be revised and extended annually.

Control records will be maintained as described in FSM 2419.

Future Yields

The allowable cut of pine will increase greatly as the plantations grow older and the stocking of the natural stands improves. The cut can be projected to the year 2000 on the basis of present timber types and condition. The projection indicates that the pine cut should almost double in the next plan period.

Table 16. Estimated Yields of Growing Stock by Species Groups & Periods - Regulated Working Group.

Species Group	Period (Fiscal Years)		
	: 1965-1974	: 1975-1984	: 1985-2000
- Thousand Cords -			
Pine	25	46	65
Aspen	34	32	32
Others	32	32	28
Total	91	110	125

The potential ultimate sustained yield is estimated at 55 cubic feet or 0.7 cords per acre per year. This amounts to a total yield of about 265,000 cords per year. This assumes the present level of multiple use management plus type conversion to arrive at the following estimated acres:

<u>Types</u>	<u>Ultimate Area (acres)</u>
Red & White Pine	150,000
Jack Pine	120,000
Aspen-Birch	70,000
Other	40,000
All	380,000

Coordination with Other Uses.

Timber management will be coordinated with other uses according to FSM 2405 and the management direction established in the Regional Guide.

Plans for cutting in specific areas will be individually adjusted according to the coordination requirements established by the Regional Guide and by the respective District multiple use plans.

Functional activities with other than a timber growth objective, when conducted in the General Forest Zone, will conform to the management direction and the coordination requirements for that zone.

DISTRICT ACTION PLAN

Compartment Budgeting

The budgeting of compartments will be done carefully so as to provide a steady flow of timber products. A proposed three-year schedule is listed. This is to be considered as a guide to budgeting sales but not a control. It is to be changed annually, not only to adjust for changing conditions and demands, but to add another year's budget to maintain a full 3-year schedule.

Prebudget reconnaissance of compartments will be made by an experienced forester. Stands will be examined and prescribed for in accordance with R-9 Timber Management Guides. The District multiple use plan will be used as a reference to determine coordination needs. Special use areas, if they exist in the compartment, will be examined and prescribed for by the District Ranger.

Before marking is done on a sale, a forester will review the prescription on the ground with the markers. A copy of the prescription will be used as a working tool in conjunction with the marking rules to insure that proper treatment is given the stand.

Proposed Compartment Budget:

<u>Mio District</u>					
F.Y. 1965:	7- 8	95	124	235	
	62-63	103	153		
	73	106	187-193		
	80-82	119	224		
1966:	18	73	125-126	177	198
	52	93	131	180	207
	56	111-112	147	185-186	230
	64-65	122	160	194	
1967:	3	74- 76	133-134	197	228
	53	79	150	199	
	66	98	178-179	201	
	71	118	184	220	

Tawas District

F.Y. 1965:	15	52	142	
	16	95	143	
	17	124-128		
	25	133		
1966:	35	81	130	154
	53	83	146	
	54	118	150	
	64	129	151	
1967:	7	80	134	
	8	98	137-140	
	11	129		
	12	131		

Harrisville District

F.Y. 1965:	1	54	141-143	192-194	
	2	75	155	205	
	41	80	180	206	
	53	82	182		
1966:	7-9	59	154	204	
	35	78	175		
	51	81	187		
	52	95- 97	200		
1967:	16	48	77	128	145
	18	60- 62	87	129	179
	44	68	93	138	
	45	76	94	140	

Sales Plan

Refer to the District 3-year plan. Additions and adjustments will be made as needed.

Road Construction

The following road construction is needed through F. Y. 1967 based on working circle and Forest priority:

<u>F.Y.</u>	<u>Miles</u>	<u>Estimated Cost</u>
1965	8.1	\$ 67,300
1966	2.3	17,300
1967		

STATISTICAL SUMMARY

A subsampling or cluster sampling arrangement was used to estimate volume, allowable cut, and certain area information. Randomly selected compartments constituted the primary sampling units and 10-factor variable radius point samples were the secondary units.

A total of 160 compartments were sampled in the 3 Districts. This gave a total of 1,032 point samples of which one-half are permanently located and marked for remeasurement.

The sampling error for growing stock is ± 9.0 percent (2 standard errors) or 213,000 cords of the estimated volume of 2,370,000 cords. In other words, the true volume of growing stock is within $\pm 213,000$ cords of the estimated total volume of 2,370,000 cords unless a 1 in 20 chance has occurred in sampling.

Sawlog volume is estimated at 91 million board feet with a sampling error of ± 22 percent or 19,751 MBM.

Growing stock sampling error by District is:

<u>District</u>	<u>Estimated Growing Stock (Cords)</u>	<u>Sampling Error (Percent)</u>
Mio	784	± 13.6
Tawas	699	± 19.2
Harrisville	<u>887</u>	± 14.4
All	2,370	± 9.0

APPENDIX A. Table of Contents

Table 1. Total area summaries for working circle and Districts.

2. Area of timbered commercial forest land by forest type and year of stand origin for working circle and Districts.
3. Area of timbered commercial forest land by forest type and site index for working circle and Districts.
4. Total net volume on timbered commercial forest land by species and kind of material.
5. Total net volume of growing stock and sawlog material on timbered commercial forest land by species and District.
6. Total periodic net annual growth on timbered commercial forest land by species and kind of material.
7. Annual allowable cut area by forest type, District and kind of cut.
8. Total net annual allowable cut volume by species and kind of material.
9. Total net annual allowable cut volume of growing stock and sawlog material by species and District.

Table 1. Area Summary
Huron Working Circle
(Acres)

Forest Type	Total	Reproduction			Poletimber			Sawtimber		
		Poor	Medium	Good	Poor	Medium	Good	Poor	Medium	Good
Spruce-fir	680	30	180	10	200	250	10			
White Pine	4,890	90	1,480	360	100	50	80	2,450	230	50
Red Pine	62,140	1,480	26,950	18,200	2,140	3,690	5,000	4,080	570	30
Jack Pine	145,900	5,290	17,620	25,570	52,370	37,630	7,380	40		
Swamp Conifers	15,770	150	670	1,200	1,630	4,050	7,860		210	
Oak	52,090	200	1,120	520	21,800	21,290	5,680	1,220	260	
Aspen-Birch	88,930	1,100	7,720	4,560	10,360	28,980	35,820	80	310	
Northern Hardwoods	5,620	100	40	160	1,100	1,680	2,470	70		
Lowland Hardwoods	4,340	30	150	20	490	1,810	1,570	30	190	50
TOTAL	380,360	8,470	55,930	50,600	90,190	99,430	65,870	7,970	1,770	130
Nonstocked Forest Land	Area	Nonforest Land			Area	Other Land			Area	
Open	6,230	Marsh & Muskeg			3,440	Unproductive Upland			10	
Upland Brush 1/	2,070	Water			330	Unproductive Lowland			90	
Lowland Brush	3,080	Other			7,870	Unregulated			10,060	
Total	11,380	Total			11,640	Total			10,160	

Total Land Area 413,540 Acres

1/ Includes 870 acres of cull oak stands.

Table 1. Area Summary
Mio District
(Acres)

Forest Type	:	Total	Reproduction			:	Poletimber			:	Sawtimber		
			Poor	Medium	Good		Poor	Medium	Good		Poor	Medium	Good
Spruce-fir		430	10	100	10		160	140	10				
White Pine		1,130	40	330			40		80		550	50	40
Red Pine		20,950	720	7,280	9,010		830	310	40		2,320	420	20
Jack Pine		70,480	3,810	7,960	10,600		26,140	18,330	3,630		10		
Swamp Conifers		4,420	60	190	320		930	1,060	1,840			20	
Oak		18,040	100	390	510		6,970	7,060	2,670		300	40	
Aspen-Birch		19,780	640	3,290	1,580		2,790	5,620	5,790			70	
Northern Hardwoods		2,040	10	30	70		360	790	780				
Lowland Hardwoods		840		60			140	440	200				
TOTAL		138,110	5,390	19,630	22,100		38,360	33,750	15,040		3,180	600	60
Nonstocked Forest Land		Area	Nonforest Land				Area	Other Land			Area		
Open		1,770	Marsh & Muskeg				690	Unproductive Lowland			60		
Upland Brush		580 ^{1/}	Water				120	Unregulated			3,890		
Lowland Brush		880	Other				3,260						
Total		3,230	Total				4,070	Total			3,950		

Total Land Area 149,360 Acres

^{1/} Includes 380 acres of cull oak stands.

Table 1. Area Summary
Tawas District

(Acres)

Forest Type	Total	Reproduction			Poletimber			Sawtimber		
		Poor	Medium	Good	Poor	Medium	Good	Poor	Medium	Good
Spruce-fir	50		20			30				
White Pine	1,090	40	210	20	40	50		620	110	
Red Pine	24,460	310	7,800	6,300	1,130	3,340	4,960	510	100	10
Jack Pine	45,060	850	5,840	9,220	16,740	9,910	2,500			
Swamp Conifers	6,240	70	300	750	420	1,160	3,400		140	
Oak	7,990	50	330	10	4,670	2,090	450	290	100	
Aspen-Birch	14,530	70	590	1,090	1,780	4,360	6,480	30	130	
Northern Hardwoods	1,600	30		10	390	90	1,080			
Lowland Hardwoods	1,820		40	20	140	540	910	30	90	50

TOTAL	102,840	1,420	15,130	17,420	25,310	21,570	19,780	1,480	670	60
Nonstocked Forest Land	Area		Nonforest Land		Area		Other Land		Area	
Open	550		Marsh & Muskeg		1,960		Unproductive Upland		10	
Upland Brush	350 1/		Water		100		Unproductive Lowland		10	
Lowland Brush	710		Other		2,870		Unregulated		4,130	
Total	1,610		Total		4,930		Total		4,150	

Total Land Area 113,530 Acres

1/ Includes 220 acres of cull oak stands.

Table 1. Area Summary
Harrisville District
(Acres)

Forest Type	Total	Reproduction			Poletimber			Sawtimber		
		Poor	Medium	Good	Poor	Medium	Good	Poor	Medium	Good
Spruce-fir	200	20	60		40	80				
White Pine	2,670	10	940	340	20			1,280	70	10
Red Pine	16,730	450	11,870	2,890	180	40		1,250	50	
Jack Pine	30,360	630	3,820	5,750	9,490	9,390	1,250	30		
Swamp Conifers	5,110	20	180	130	280	1,830	2,620		50	
Oak	26,060	50	400		10,160	12,140	2,560	630	120	
Aspen-Birch	54,620	390	3,840	1,890	5,790	19,000	23,550	50	110	
Northern Hardwoods	1,980	60	10	80	350	800	610	70		
Lowland Hardwoods	1,680	30	50		210	830	460		100	
TOTAL	139,410	1,660	21,170	11,080	26,520	44,110	31,050	3,310	500	10
Nonstocked Forest Land	Area	Nonforest Land			Area			Other Land		
Open	3,910	Marsh & Muskeg			790			Unproductive Lowland		
Upland Brush	1,140 1/	Water			110			Unregulated		
Lowland Brush	1,490	Other			1,740					
Total	6,540	Total			2,640			Total		

Total Land Area 150,650 Acres

1/ Includes 270 acres of cull oak stands.

Table 2. Area of Timbered Commercial Forest Land by Forest Type and Year of Stand Origin - Huron Working Circle - Regulated Area.
(Acres)

Forest Type	:	:	Year of Stand Origin									
			1945-	1935-	1925-	1915-	1905-	1895-	1885-	1875-	1865-	All
			1964	1944	1934	1924	1914	1904	1894	1884		Age
Spruce-fir		700	200			*	200	300				
White Pine		4,900	1,400	500	100	100		100	900	1,500	300	
Red Pine		62,100	21,000	9,600	23,800	1,600	2,300	300	1,400	900	1,200	
Jack Pine		145,900	18,000	18,900	30,200	53,300	24,800	700				
Swamp Conifers		15,800		300	800	600	1,900	4,400	4,000	2,500	900	400
Oak		52,100	*	*	7,000	29,800	8,700	6,600		*	*	
Aspen-Birch		89,000	11,800	1,100	37,300	33,500	4,800	300	200			
Northern Hardwoods		5,600			400	3,200		200				1,800
Lowland Hardwoods		4,300	*		100	300	1,000	1,400	800	100		600
All Types		380,400	52,400	30,400	99,700	122,400	43,700	14,300	7,300	5,000	2,400	2,800

* Less than 50 acres.

Table 2. Area of Timbered Commercial Forest Land by Forest Type and Year of Stand Origin - Mio District - Regulated Area.

		(Acres)																			
Forest Type	:	:	Year of Stand Origin																		
	Total	:	1945-	:	1935-	:	1925-	:	1915-	:	1905-	:	1895-	:	1885-	:	1875-	:	1865-	:	All
	:	:	1964	:	1944	:	1934	:	1924	:	1914	:	1904	:	1894	:	1884	:	:	:	Age
Spruce-fir	400		100					*		100		200									
White Pine	1,100		400					100						200		300		100			
Red Pine	21,000		7,200		5,300		4,200		700		1,500		300		1,000		300		500		
Jack Pine	70,500		6,800		9,400		11,100		29,200		13,500		500								
Swamp Conifers	4,400						800		600		1,100		1,600		200						100
Oak	18,100				*		1,500		7,800		3,200		5,600								
Aspen-Birch	19,800		5,200		300		6,100		6,900		1,000		300								
Northern Hardwoods	2,000						400		1,500				*								100
Lowland Hardwoods	800						100		300				300								100
All Types	138,100		19,700		15,000		24,200		47,100		20,400		8,800		1,400		600		600		300

* Less than 50 acres.

Table 2. Area of Timbered Commercial Forest Land by Forest Type and
Year of Origin - Tawas District - Regulated Area.
(Acres)

Forest Type	:	:	Year of Stand Origin										:	All
			1945-	1935-	1925-	1915-	1905-	1895-	1855-	1875-	1865-	Age		
		Total	1964	1944	1934	1924	1914	1904	1894	1884				
Spruce-fir		*												
White Pine		1,100	*	200	100				300	300	200			
Red Pine		24,500	1,800	2,500	18,800	300	500	*	300	200	100			
Jack Pine		45,100	8,900	5,400	8,000	16,800	5,800	200						
Swamp Conifers		6,300		300			200	1,800	2,100	1,700	100	100		
Oak		8,000	*	*	600	5,400	1,400	600						
Aspen-Birch		14,500	1,200		3,500	9,200	500	*	100					
Northern Hardwoods		1,600				800							800	
Lowland Hardwoods		1,800				*	700	700		100			300	
All Types		102,900	11,900	8,400	31,000	32,500	9,100	3,300	2,800	2,300	400	1,200		

* Less than 50 acres.

Table 2. Area of Timbered Commercial Forest Land by Forest Type and
Year of Origin - Harrisville District - Regulated Area.
(Acres)

Forest Type	:	:	Year of Stand Origin										:	All
			Total	1945- 1964	1935- 1944	1925- 1934	1915- 1924	1905- 1914	1895- 1904	1855- 1984	1875- 1884	1865		
Spruce-fir			300	100				100	100					
White Pine			2,700	1,000	300				100	400	900			
Red Pine			16,600	12,000	1,800	800	600	300	*	100	400	600		
Jack Pine			30,300	2,300	4,100	11,100	7,300	5,500	*					
Swamp Conifers			5,100				*	600	1,000	1,700	800	800	200	
Oak			26,000			4,900	16,600	4,100	400		*	*		
Aspen-Birch			54,700	5,400	800	27,700	17,400	3,300	*	100				
Northern Hardwoods			2,000				900		200				900	
Lowland Hardwoods			1,700	*				300	400	800			200	
All Types			139,400	20,800	7,000	44,500	42,800	14,200	2,200	3,100	2,100	1,400	1,300	

* Less than 50 acres.

Table 3. Area of Timbered Commercial Forest Land by Forest Type and Site Index Classes, Huron Working Circle - Regulated Area.
(Acres)

Forest Type	:	Total	Site Index Class												
			:	30	:	40	:	50	:	60	:	70	:	80	
Spruce-fir		700					100			400		200			
White Pine		4,900								3,200		1,700			
Red Pine		62,100					800			57,200		4,000		100	
Jack Pine		145,900					4,300			137,600		4,000			
Swamp Conifers		15,800		4,100			7,900			3,800					
Oak		52,100					4,700			39,100		7,000		1,300	
Aspen-Birch		89,000					200			16,400		52,400		19,300	700
Northern Hardwoods		5,600								1,300		4,300			
Lowland Hardwoods		4,300								1,300		2,300		700	
Total		380,400		4,100			18,000			260,300		75,900		21,400	700

Table 3. Area of Timbered Commercial Forest Land by Forest Type and Site Index Classes, Mio District - Regulated Area.
(Acres)

Forest Type	Total	Site Index Class					
		30	40	50	60	70	80
Spruce-fir	400		100	100	200		
White Pine	1,100			900	200		
Red Pine	21,000			20,600	400		
Jack Pine	70,500		400	69,300	800		
Swamp Conifers	4,400	300	2,400	1,700			
Oak	18,100		2,200	14,000	1,900		
Aspen-Birch	19,800		200	5,200	13,300	1,100	
Northern Hardwoods	2,000			400	1,600	*	
Lowland Hardwoods	800			300	500		
Total	138,100	300	5,300	112,500	18,900	1,100	

* Less than 50 acres.

Table 3. Area of Timbered Commercial Forest Land by Forest Type and Site Index Classes, Tawas District - Regulated Area.
(Acres)

Forest Type	:	:	Site Index Class					
			:	:	:	:	:	:
	Total		30	40	50	60	70	80
Spruce-fir	*							
White Pine	1,100				800	300		
Red Pine	24,500			100	22,400	2,000		
Jack Pine	45,100			2,100	42,500	500		
Swamp Conifers	6,300	2,700		3,300	300			
Oak	8,000			600	6,100	1,300		
Aspen-Birch	14,500				900	5,700	7,400	500
Northern Hardwoods	1,600					1,600		
Lowland Hardwoods	1,800			*	200	900	700	
Total	102,900	2,700		6,100	73,200	12,300	8,100	500

* Less than 50 acres.

Table 3. Area of Timbered Commercial Forest Land by Forest Type and Site Index Classes, Harrisville District - Regulated Area.
(Acres)

Forest Type	:	:	Site Index Class					
			:	:	:	:	:	:
	Total	:	30	40	50	60	70	80
Spruce-fir	300				300			
White Pine	2,700				1,500	1,200		
Red Pine	16,600			700	14,200	1,600	100	
Jack Pine	30,300			1,800	25,800	2,700		
Swamp Conifers	5,100	1,100		2,200	1,800			
Oak	26,000			1,900	19,000	3,800	1,300	
Aspen-Birch	54,700				10,300	33,400	10,800	200
Northern Hardwoods	2,000				900	1,100		
Lowland Hardwoods	1,700				800	900		
Total	139,400	1,100		6,600	74,600	44,700	12,200	200

Table 4. Total Net Volume on Timbered Commercial Forest Land by Species & Kind of Material - Regulated Working Group.

Species	: Growing : Stock <u>1/</u> - Cords -	: Cordwood : Material - Cords -	: Sawlog : Material <u>2/</u> - MBM -
Balsam Fir	18,600	18,600	
White Pine	65,200	23,600	20,800
Red Pine	150,700	89,300	30,700
Hemlock	7,100	5,100	1,000
Jack Pine	609,100	609,100	
Cedar	67,800	67,800	
Spruce & Tamarack	<u>49,500</u>	<u>49,500</u>	
Softwoods	968,000	863,000	52,500
White Oak	48,400	38,200	5,100
Red Oak	551,500	496,900	27,300
Aspen	605,100	605,100	
Basswood	28,400	26,800	800
Sugar Maple	11,200	11,200	
Red Maple	52,600	49,200	1,700
Ash	14,600	12,400	1,100
Elm	11,900	10,100	900
Paper Birch	65,100	63,100	1,000
Misc. Hardwoods	<u>12,800</u>	<u>12,400</u>	<u>200</u>
Hardwoods	1,401,600	1,325,400	38,100
All Species	2,369,600	2,188,400	90,600

1/ Net volume of all live merchantable trees 5.0" d.b.h. and larger to a variable top d.i.b. of not less than 4.0".

2/ Softwoods - 9.0" d.b.h. and larger to a variable top d.i.b. of not less than 8.0".

Hardwoods - 11.0" d.b.h. and larger to a variable top d.i.b. of not less than 10.0".

Table 5. Total Net Volume of Growing Stock & Sawlog Material on Timbered Commercial Forest Land by Species & District - Regulated Working Group.

Species	Total	Growing Stock <u>1/</u>			Total	Sawlog Material <u>2/</u>		
		Mio	Tawas	Harrisville		Mio	Tawas	Harrisville
Balsam Fir	18,600		6,500	12,100				
White Pine	65,200	17,900	17,200	30,100	20,800	5,000	5,200	10,600
Red Pine	150,700	53,700	70,400	26,600	30,700	14,500	7,400	8,800
Hemlock	7,100		3,400	3,700	1,000		1,000	
Jack Pine	609,100	329,700	160,400	119,000				
Cedar	67,800	4,800	36,200	26,800				
Spruce & Tamarack	49,500	10,800	23,600	15,100				
Softwoods	968,000	416,900	317,700	233,400	52,500	19,500	13,600	19,400
White Oak	48,400	30,000	4,300	14,100	5,100	2,800	100	2,200
Red Oak	551,500	164,700	146,200	240,600	27,300	9,800	6,700	10,800
Aspen	605,100	145,000	157,200	302,900				
Basswood	28,400	3,000	17,700	7,700	800		800	
Sugar Maple	11,200	3,000	5,400	2,800				
Red Maple	52,600	11,100	17,100	24,400	1,700		1,100	600
Ash	14,600	2,100	9,500	3,000	1,100		1,100	
Elm	11,900	1,500	1,400	9,000	900		300	600
Paper Birch	65,100	6,800	19,100	39,200	1,000		100	900
Misc. Hardwoods	12,800	200	3,000	9,600	200	100	100	
Hardwoods	1,401,600	367,400	380,900	653,300	38,100	12,700	10,300	15,100
All Species	2,369,600	784,300	698,600	886,700	90,600	32,200	23,900	34,500

1/ Net volume of all live merchantable trees 5.0" d.b.h. and larger to a variable top diameter inside bark of not less than 4.0".

2/ Softwoods - 9.0" d.b.h. and larger to a variable top d.i.b. of not less than 8.0".
Hardwoods - 11.0" d.b.h. and larger to a variable top d.i.b. of not less than 10.0".

Table 6. Total Periodic Net Annual Growth on Timbered Commercial Forest Land by Species & Kind of Material - Regulated Working Group.

Species	: : Growing : Stock <u>1/</u> - Cords -	: : Cordwood : Material - Cords -	: : Sawlog : Material <u>2/</u> - MBM -
Balsam Fir	900	900	
White Pine	2,100	700	700
Red Pine	16,800	13,800	1,500
Hemlock	300	300	*
Jack Pine	33,900	33,900	
Cedar	4,000	4,000	
Spruce & Tamarack	<u>1,000</u>	<u>1,000</u>	
Softwoods	59,000	54,600	2,200
White Oak	2,100	1,300	400
Red Oak	35,500	28,700	3,400
Aspen	22,500	22,500	
Maple	9,400	8,400	500
Paper Birch	2,800	2,400	200
Misc. Hardwoods	<u>3,300</u>	<u>2,100</u>	<u>600</u>
Hardwoods	75,600	65,400	5,100
All Species	134,600	120,000	7,300

1/ Net volume of all live merchantable trees 5.0" d.b.h. and larger to a variable top d.i.b. of not less than 4.0".

2/ Softwoods - 9.0" d.b.h. and larger to a variable top d.i.b. of not less than 8.0".
Hardwoods - 11.0" d.b.h. and larger to a variable top d.i.b. of not less than 10.0".

* Less than 50 acres.

Table 7. Annual Allowable Cut by District, Kind of Cut, and Forest Type-
Regulated Working Group.

	:	:	White	:	Red	:	Jack	Swamp	:	:	Aspen-	:	Other	
	:	Total	:	Pine	:	Pine	:	Pine	:Conifers:	Oak	:	Birch	:	Hdwds.
	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Mio District														
Intermediate		300		100		160								40
Preparatory		970						970						
Final Regeneration		2250						900		790		560		
Tawas District														
Intermediate		760				560		30						170
Preparatory		700						700						
Final Regeneration		1680				30		400	190	140		920		
Harrisville District														
Intermediate		340		130				40		50				120
Preparatory		420						420						
Final Regeneration		3000						510	150	590		1750		
All Districts														
Intermediate		1400		230		720		70		50				330
Preparatory		2090						2090						
Final Regeneration		6930				30		1810	340	1520		3230		
TOTAL		9020		230		750		3970	340	1570		3230		330

Table 8. Total Net Annual Allowable Cut Volume by Species and Kind of Material - Regulated Working Group.

Species	: Growing : Stock <u>1/</u> - Cords -	: Cordwood : Material - Cords -	: Sawlog : Material <u>2/</u> - MBM -
Balsam Fir	890	890	
White Pine	1,370	330	520
Red Pine	1,720	660	530
Hemlock	370	170	100
Jack Pine	21,450	21,450	
Cedar	2,150	2,150	
Spruce	<u>730</u>	<u>730</u>	<u> </u>
Softwoods	28,680	26,380	1,150
White Oak	1,310	1,090	110
Red Oak	20,370	17,530	1,420
Aspen	33,930	33,930	
Basswood	100	100	
Sugar Maple	380	380	
Red Maple	1,850	1,690	80
Ash	190	190	
Elm	210	150	30
Paper Birch	3,140	2,940	100
Misc. Hardwoods	<u>460</u>	<u>460</u>	<u> </u>
Hardwoods	61,940	58,460	1,740
All Species	90,620	84,840	2,890

1/ Net volume of all live merchantable trees 5.0" d.b.h. and larger to a variable top d.i.b. of not less than 4.0".

2/ Softwoods - 9.0" d.b.h. and larger to a variable top d.i.b. of not less than 8.0".

Hardwoods - 11.0" d.b.h. and larger to a variable top d.i.b. of not less than 10.0".

Table 9. Total Net Annual Allowable Cut Volume of Growing Stock & Sawlog Material by Species, District - Regulated Working Group.

Species	Total	Mio	Tawas	Harrisville
GROWING STOCK - CORDS				
White & Red Pine	3,090	1,350	930	810
Hemlock	370		340	30
Jack Pine	21,450	11,320	5,880	4,250
Cedar	2,150		1,130	1,020
Spruce-fir	1,620		640	980
Aspen	33,930	8,950	12,760	12,220
Oak	21,680	9,020	4,180	8,480
Maple	2,230	1,130	560	540
Ash-Elm	400	100	90	210
Paper Birch	3,140	140	350	2,650
Misc. Hardwoods	560		170	390
All Species	90,620	32,010	27,030	31,580
SAWLOG MATERIAL - MBM				
Red & White Pine	1,050	560	210	280
Hemlock	100		100	
Oak	1,530	720	210	600
Maple	80		50	30
Ash-Elm	30			30
Paper Birch	100			100
All Species	2,890	1,280	570	1,040

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